REMARKS/ARGUMENTS

The present Amendment is in response to the Office Action having a mailing date of January 5, 2005. Claims 1-14 are pending in the present Application. Applicant has added claims 30, 31, 32 and 33. Consequently, claims 1-14 and 30-33 remain pending in the present Application.

New claims 30 and 32 recite the magnetic elements of claims 1 and 14, respectively, wherein the magnetic element further includes leads which can drive the current through the magnetic element in a current-perpendicular-to-plane (CPP) direction. Support for claims 30 and 32 can be found in Figures 2 and 3 and the accompanying discussion. New claims 31 and 33 recite the use of a free layer including first and second ferromagnetic layers that are separated by a separation layer and have their magnetizations aligned antiparallel. Support for new claims 31 and 33 can be found in Figure 4A of the present application and the accompanying discussion in the specification. Accordingly, Applicant respectfully submits that no new matter is added.

In the above-identified Office Action, the Examiner rejected claims 1 and 14 under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 5,239,504 (Brady). The Examiner also rejected claims 2-13 under 35 U.S.C. § 103 as being unpatentable over Brady in view of Applicant's admitted prior art (AAPA).

In the above-identified Office Action, the Examiner rejected claims 1 and 14 under 35 U.S.C. § 102 as being anticipated by Brady. In so ding, the Examiner cited Figs. 5-6 of Brady.

Applicant respectfully disagrees with the Examiner. Independent claims 1 and 14 recite a plurality of magnetic elements, each of which is "configured to be written using spin transfer. . ." claim 1 recites the use of "at least one stress-assist layer configured to exert at least one stress on at least one magnetic element of the plurality of magnetic elements during writing." Similarly, claim 14 recites the use of "at least one stress-assist layer configured to exert at least one stress on

at least one magnetic element of the plurality of magnetic elements during writing, the stress-assist layer including at least one of a piezoelectric and an electrostrictive material." Thus, through the use of the stress-assist layer, switching of the magnetization of the magnetic element is facilitated. Specification, page 13, lines 7-20.

Although a stress assist layer is used, switching is accomplished using spin transfer. Thus, as recited in claims 1 and 14, the magnetic elements are configured to be written using spin transfer. Spin transfer allows the magnetic elements to be switched by driving a current through the magnetic element in a current-perpendicular-to-plane (CPP) direction. Specification, page 12, line 13-page 13, line 6. The magnetic elements may, therefore, be switched without using an external applied field. In order for spin transfer to be used as a switching mechanism, the lateral dimensions of the magnetic element may be small, on the order of a few hundred nanometers, and the free layer may be thin, for example less than ten nanometers for Co. Specification, page 3, lines 13-23. Consequently, for the magnetic element to be configured to be switched using spin transfer, ins some embodiments, the lateral dimensions of the magnetic element may be small, on the order of a few hundred nanometers, and the free layer may be thin, for example less than ten nanometers for Co.

In contrast, Brady neither teaches nor suggests the use of a stress assist layer in conjunction with a magnetic element configured to be written using spin transfer. Although Brady describes a magnetic element that includes a layer that assists in switching the magnetization, Brady does not describe the use of spin transfer. Instead, Brady describes a number of other mechanisms for writing, all of which use an external applied field and none of which include spin transfer. For example, Brady describes thermomagnetic writing, which heats the magnetic element, then cools the magnetic element in a field, writing using a combination of

an applied field and energy provided by a laser beam, or writing using a combination of an applied field and an acoustic wave. Brady, col. 1, lines 23-31, col. 3, lines 10-24; and col. 6, lines 20-44. However, in all cases, an external magnetic field rather than a current through the magnetic element is used. Because Brady utilizes other mechanisms for writing, the magnetic elements of Brady are not configured for spin transfer. Thus, for example, there is no indication that the lateral dimensions of the magnetic element of Brady are sufficiently small for spin transfer to take place. Consequently, Brady fails to teach or suggest the use of magnetic elements configured to be switched using spin transfer in conjunction with stress assist layer(s). Brady, therefore, fails to teach or suggest the magnetic memories recited in claims 1 and 14.

The Examiner also rejected claims 2-13 under 35 U.S.C. § 103 as being unpatentable over Brady in view of AAPA. In so doing, the Examiner stated that the "AAPA discloses [that] the magnetic element includes spin tunneling junction, pinned layer, first ferromagnetic layer and second ferromagnetic layer as claimed in claims 3-10 (Figs. 1A-1B and depending portions of the specification)."

Applicant respectfully disagrees with the Examiner's rejection. Claims 2-13 depend upon independent claim 1. Consequently, claims 2-13 also recite the use of magnetic elements configured to be written using spin transfer in conjunction with at least one stress assist layer.

One of ordinary skill in the art would not have been motivated to add the AAPA to the system of Brady. As discussed above, Brady describes systems which are written using various mechanisms that are different from spin transfer. Thus, the systems of Brady use a single ferromagnetic layer, which stores the data. The remaining layer, such as the electrostrictive layer 10 of Figs 1-5 of Brady and the piezoelectric layer of Fig. 6 of Brady, is used because of the particular type of writing used in Brady. There is no indication in Brady that the system does not function

well for its intended purpose: storing data using the writing mechanisms disclosed by Brady. Furthermore, the AAPA describes magnetic elements 10 and 10' that might written by driving a current through the magnetic element that is sufficiently large to switch the magnetization direction of the free layer 18/18'. There is no indication that the system of Brady could function using spin transfer. Conversely, there is no indication in the AAPA how the system of Bradley, which utilizes a piezoelectric or electrostrictive material requiring energy in the form of lasers or acoustic waves, could or should be incorporated into a magnetic element written using a current driven through the magnetic element. Consequently, one of ordinary skill in the art would not be motivated to combine the magnetic element of the AAPA with that of Brady. Accordingly, Applicant respectfully submits that claims 2-13 are allowable over the cited references.

Moreover, Applicant respectfully submits that claims 6, 9, and 10 are also separately allowable over the cited references. Claim 6 recites that the free layer has a surface anisotropy and a total anisotropy perpendicular to a stable state of the free layer. Claim 6 further recites that the capping layer is configured to modify the surface anisotropy to reduce the total perpendicular anisotropy and is capable of including Cu, Au, Pd or Pt. Applicant has found no mention in the AAPA or Brady of modifying the surface anisotropy of the free layer in order to reduce the total perpendicular anisotropy of the free layer. Consequently, Brady in view of the AAPA does not teach or suggest this feature. Accordingly, Applicant respectfully submits that claim 6 is separately allowable over the cited references.

Claim 9 recites a magnetic memory in which the at least one magnetic element includes at least one spin valve portion and at least one spin tunneling junction portion. Claim 9 further recites that the at least one spin valve portion and the at least one spin tunneling junction portion sharing the free layer. Claim 10 depends upon claim 9. Applicant can find no mention in the

AAPA of the use of a magnetic element that includes a spin valve portion and a spin tunneling junction portion that share a free layer. Similarly, Brady is devoid of mention of such a magnetic element. Accordingly, Applicant respectfully submits that claims 9-10 are separately allowable over the cited references.

New claims 30-33 depend upon claims 1 and 14. Consequently, the arguments herein apply with full force to claims 30-33. Accordingly, Applicant respectfully submits that claims 30-33 are allowable over the cited references.

Applicant's attorney believes that this application is in condition for allowance. Should any unresolved issues remain, Examiner is invited to call Applicant's attorney at the telephone number indicated below.

Respectfully submitted,

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Date

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